CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/Gradation/2012-13

18.04.2013

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Subdivision, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and Drains at Sarayipalaya Layout in Ward No.06, Byatarayanapura, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/W.O/471/2012-13 Dated: 20.03.2013

Date of Testing : 18.04.2013

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **26300**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	990	990	3.8	96.2	95-100
22.4	6430	7420	28.2	71.8	60-80
11.2	5685	13105	49.8	50.2	40-60
4.75	4520	17625	67.0	33.0	25-40
2.36	3680	21305	81.0	19.0	15-30
0.600	2265	23570	89.6	10.4	8-22
0.075	2445	26015	98.9	1.1	0-8

Note:

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Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/AIV/2012-13 18.04.2013

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Subdivision, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and Drains at Sarayipalaya Layout in Ward No.06, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/KRIDL/W.O/471/2012-13 Dated: 20.03.2013
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	18.04.2013

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	382.5	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	88.5	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	304	294	299	
4	Aggregate Impact value = percent fines	21.85	23.14	22.54	
	$100^* (W_2/W_1)\%$				22.51

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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(Building, Geo-Tech & High way Material Testing Research Laboratory)

Engineering Project Consultants

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/Shape.T/2012-13 : 18.04.2013

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client : **Asst. Executive Engineer,** Byatarayanapura Subdivision, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and Drains at Sarayipalaya Layout in Ward No.06, Byatarayanapura, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/W.O/471/2012-13 Dated: 20.03.2013

Technical Reference : IS 2386(Part 1) 1963 (RA 2007)

Type of Mix : Wet Mix Macadam

Date of Testing : 18.04.2013

Passing through IS Sieve, mm	Retained On IS Sieve, mm	Weight of Sieved Fraction (W) gms		Proportion of Size range in the sample, X = 100xW/ΣW		Weight of 200 pieces of aggregates of the range, (P) in gms		Thickness gauge size, mm	Weight of flaky particles (F)in gms		Percentage by Weight of flaky aggregates in gms Y= 100xF/P	Weighed Percentage of flaky aggregates in gms XY=X × Y	Weight of fraction consisting of at least 200 Pieces in gms		Length gauge size in mm	Weight of aggregates in each fraction retained on Length gauge in gms	
63.00	50.00	W1		X1		P1		33.90	F1				P1		-	E1	
50.00	40.00	W2	2849	X2	20.53	P2	3025	27.00	F2	483	15.97	327.76	P2	3025.0	81.00	E2	282
40.00	31.50	W3	2385	X3	17.18	P3	2632	21.50	F3	370	14.06	241.57	P3	2632.0	64.40	E3	248
31.50	25.00	W4	1846	X4	13.30	P4	1749	16.95	F4	282	16.12	214.45	P4	-	-	E4	-
25.00	20.00	W5	2278	X5	16.41	P5	2147	13.50	F5	201	9.36	153.66	P5	2147.0	40.50	E5	210
20.00	16.00	W6	1792	X6	12.91	P6	1694	10.80	F6	163	9.62	124.24	P6	1694.0	32.40	E6	197
16.00	12.50	W7	1453	X7	10.47	P7	1341	8.55	F7	96	7.16	74.95	P7	1341.0	25.60	E7	174
12.50	10.00	W8	897	X8	6.46	P8	728	6.75	F8	88	12.09	78.12	P8	728.0	20.20	E8	119
10.00	6.30	W9	379	X9	2.73	P9	267	4.89	F9	74	27.72	75.68	P9	267.0	14.70	E9	104
		Σ W	13879.0								ΣXY	1290.44	ΣP	11834.0		ΣE	1334.0

Result : Flakiness Index = **12.90%**

Elongation Index = **11.27%**

Result : Combined Flakiness & Elongation index **24.18%**

Note:

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Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/AL/2012-13 18.04.2013

ATTERBERG LIMITS TEST FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Subdivision, BBMP, Bangalore.

Agency : **Technical Manager**, KRIDL, Bangalore.

Name of Work : Improvements to Roads and Drains at Sarayipalaya Layout in Ward No.06, Byatarayanapura, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/W.O/471/2012-13 Dated: 20.03.2013

Date of Testing : 18.04.2013

Material : WMM

Sample Location : WMM Mix Plant

As per MORTH Table 400-11

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	22.30	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CTCE/BBMP/W.No.06/KRIDL/BM/Bitumen/2012-13 15.05.2013

BITUMEN CONTENT DETERMINATION OF BITUMINOUS MACADAM MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Subdivision, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads and Drains at Sarayipalaya Layout in Ward No.06, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/W.O/471/2012-13 Dated: 20.03.2013
SAMPLE I/D	Roads in Saraipalya Layout Ward No.06. BBMP
DATE OF TESTING	15.05.2013

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	482	482.5
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	18	17.50
7. Bitumen content in %	3.60	3.50
8. Average	3.55	

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Job No.: CTCE/BBMP/W.No.06/KRIDL/BM/Bitumen/2012-13 15.05.2013

BITUMEN CONTENT DETERMINATION OF BITUMINOUS MACADAM MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Subdivision, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads and Drains at Sarayipalaya Layout in Ward No.06, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/W.O/471/2012-13 Dated: 20.03.2013
SAMPLE I/D	Roads in Saraipalya Layout Ward No.06. BBMP
DATE OF TESTING	15.05.2013

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	26.31	5.46	5.46	94.54	90-100
13.2	85.64	17.77	23.23	76.77	56-88
4.75	260.3	54.00	77.23	22.77	16-36
2.36	74.51	15.46	92.69	7.31	4-19
0.3	15.62	3.24	95.93	4.07	2-10
0.075	4.58	0.95	96.88	3.12	0-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	26.35	5.46	5.46	94.54	90-100
13.2	95.86	19.87	25.33	74.67	56-88
4.75	252.4	52.31	77.64	22.36	16-36
2.36	60.25	12.49	90.13	9.87	4-19
0.3	26.31	5.45	95.58	4.42	2-10
0.075	4.82	1.00	96.58	3.42	0-8

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BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Subdivision, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads and Drains at Sarayipalaya Layout in Ward No.06, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/W.O/471/2012-13 Dated: 20.03.2013
SAMPLE I/D	Roads in Saraipalya Layout Ward No.06. BBMP
DATE OF TESTING	17.05.2013

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	476	475
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	24	25.00
7. Bitumen content in %	4.80	5.00
8. Average	**4.90**	

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BITUMEN CONTENT AFTER GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Subdivision, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads and Drains at Sarayipalaya Layout in Ward No.06, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/W.O/471/2012-13 Dated: 20.03.2013
SAMPLE I/D	Roads in Saraipalya Layout Ward No.06. BBMP
DATE OF TESTING	17.05.2013

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-4 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	32.65	6.86	6.86	93.14	90-100
4.75	257.4	54.08	60.93	39.07	35-51
2.36	54.62	11.47	72.41	27.59	24-39
1.18	47.85	10.05	82.46	17.54	15-30
0.3	28.92	6.08	88.54	11.46	9-19
0.075	31.62	6.64	95.18	4.82	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-4 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	25.69	5.41	5.41	94.59	90-100
4.75	257.8	54.27	59.68	40.32	35-51
2.36	58.36	12.29	71.97	28.03	24-39
1.18	32.61	6.87	78.83	21.17	15-30
0.3	28.54	6.01	84.84	15.16	9-19
0.075	52.19	10.99	95.83	4.17	3-8

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